

### **REMARKS**

Applicant has amended claims 1, 4, 5, 18, 21 and 22 and canceled claims 3 and 20. Applicant considers that the claims, as amended, traverse the rejections in the outstanding Office Action.

The amendments to claims 1 and 18 make it clear that the illuminating radiation comes from one or more radiation sources, at least one of which must be adjacent to and within the reflective enclosure. Applicant considers that these amendments clearly differentiate the present invention from the Chin et al. United States Patent No. 6,343,223, the primary reference relied on by the Examiner. By having the source of radiation (and in some cases, the detector) within the reflective enclosure, this allows radiation emitted in any direction by the radiation source to be reflected by the reflective enclosure into the sample. This, in turn, smoothes the variance caused by different pathlengths and increases the amount of radiation available for the detector. Placing the radiation source outside the enclosure, even if adjacent to it, does not provide these advantages since it limits the angle of illumination that is reflected by the reflective enclosure and thus reaches the detector. Accordingly, applicant considers that this clearly differentiates the cited reference.

The Examiner suggested that Figure 5D of the Chin et al. '223 patent discloses having radiation sources within the reflective enclosure. Applicant respectfully disagrees with the Examiner. In all of the aspects of Figure 5, "e" represents the emitter or illumination source and "d" is the detector. Figure 5D shows the emitter "e" and the detector "d" being adjacent to and outside of the reflective enclosure, the area between reflectors 133 and 134. Thus, neither the illumination source nor the detector is inside this enclosure. The purpose of having the reflective enclosure, as stated in column 7, lines 9-20, of the Chin et al. '223 patent, is to cause the light path to be longer than it would be without the reflective enclosure, not to increase illumination or smooth variances in pathlength. Placing the illumination source or emitter at the location shown in Figure 5D will only allow collection of light that is directed toward reflector 134, not light in any other direction. In contrast, having the radiation source inside the reflective enclosure, as is claimed in amended claims 1 and 18, will allow light that otherwise would be lost to be included

within the enclosure. Since one of the problems common in measurement through an appendage is low signal, collecting light from all directions increases the effective illumination from the radiation sources. In addition, another problem with having the illumination source outside the reflective enclosure is that there is a substantial variance in pathlength depending where the source and detector are located. Since the absorption by the material of interest depends on the pathlength as well as the concentration, variance in pathlength can yield varying values.

Pulse oximeters such as are described in the Chin patent do not measure concentration but rather ratios of absorption at two distinct wavelengths to give a relative amount of oxygen in the blood. For that usage, concentration does not matter. In contrast, the present invention concerns a device that can measure concentration of a constituent of interest. As such, the variance in pathlength caused by having the radiation source outside the enclosure provides a problem in accuracy. Placing the radiation source inside the reflective enclosure smoothes out the differences in pathlength and therefore leads to less variability and a more accurate value. This is not taught or suggested by the Chin reference.

None of the other references cited by the Examiner cure the problems with the Chin '223 patent. While the Seeker '784 patent shows axial positioning of the illumination sources, there is no reflective enclosure. Similarly, the Branigan et al. '717 patent merely shows a sensor system for a pulse oximeter having the illumination source and the detector attached to the same bandage that is wrapped around the finger. Again, there is no reflective enclosure in Branigan nor are the problems of dealing with pathlength disclosed.

Accordingly, none of the cited references show a reflective enclosure of the type claimed in the present application, as amended, where the radiation source is included within that reflective enclosure. The Chin '223 patent always keeps the sources outside the reflective enclosure and the Seeker '784 and Branigan '717 patents do not have reflective enclosures. Thus, nothing shows or renders obvious the present invention.


**CONCLUSION**

In light of the foregoing amendments and remarks, Applicant respectfully traverses the rejections by the Examiner. Application requests that the Examiner allow the pending claims. prompt notification of allowance is requested.

It is not believed that any fees are do with the filing of this Amendment and Reply, however the Commissioner of Patents is hereby authorized to charge any fees to Deposit Account No. 16-0085, Reference No. 19971/2002.

Respectfully submitted,

Date: January 28, 2005



---

Name: Ralph A. Loren  
Registration No.: 29,325  
Customer No.: 29933  
Palmer & Dodge LLP  
111 Huntington Avenue  
Boston, MA 02199-7613  
Tel: 617-239-0100